FIG. 1A

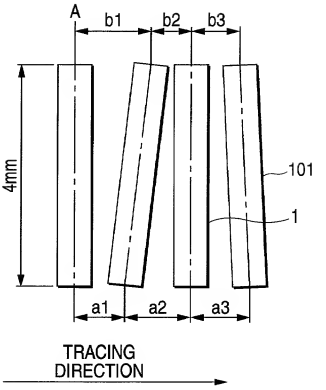
A
b1
b2
b3
4mm
101
1
a1
a2
a3
TRACING
DIRECTION

FIG. 1B

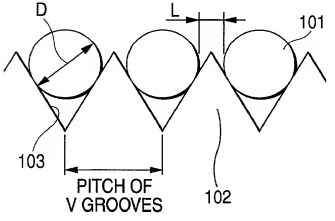
D
L
101
103
PITCH OF
V GROOVES
102

FIG. 2

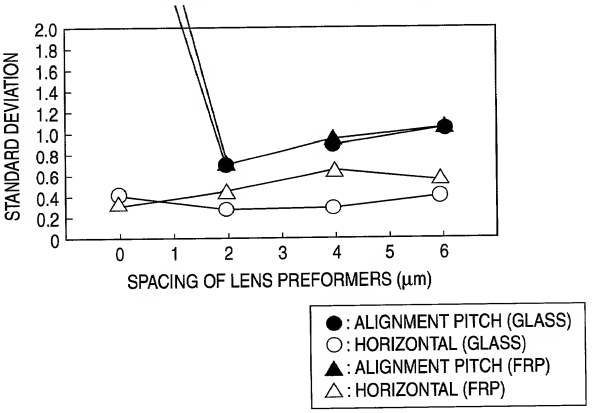
RELATIONSHIP BETWEEN THE SPACING OF LENS PREFORMERS AND EACH OF THE VARIATION IN ALIGNMENT PITCH AND THE HORIZONTAL VARIATION
STANDARD DEVIATION
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
0 1 2 3 4 5 6
SPACING OF LENS PREFORMERS (μm)
● : ALIGNMENT PITCH (GLASS)
○ : HORIZONTAL (GLASS)
▲ : ALIGNMENT PITCH (FRP)
△ : HORIZONTAL (FRP)

FIG. 3

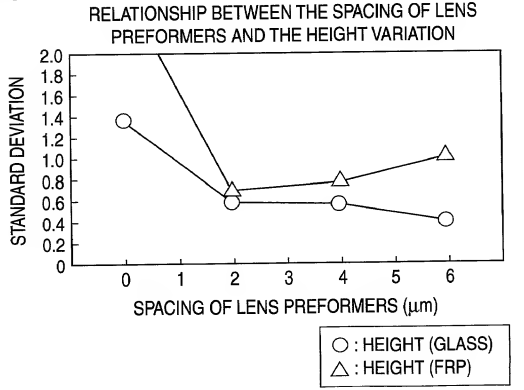
RELATIONSHIP BETWEEN THE SPACING OF LENS PREFORMERS AND THE HEIGHT VARIATION
STANDARD DEVIATION
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0
0 1 2 3 4 5 6
SPACING OF LENS PREFORMERS (μm)
○ : HEIGHT (GLASS)
△ : HEIGHT (FRP)

FIG. 4

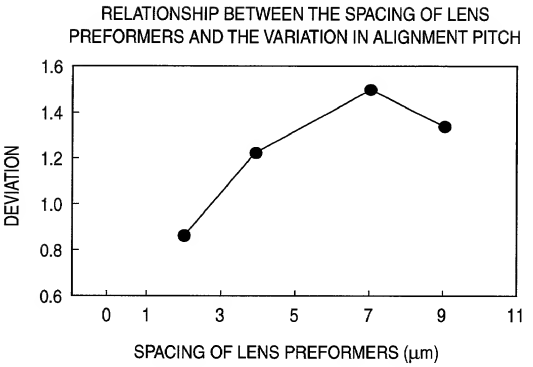
RELATIONSHIP BETWEEN THE SPACING OF LENS PREFORMERS AND THE VARIATION IN ALIGNMENT PITCH
DEVIATION
1.6
1.4
1.2
1.0
0.8
0.6
0
1
3
5
7
9
11
SPACING OF LENS PREFORMERS (μm)

FIG. 5A

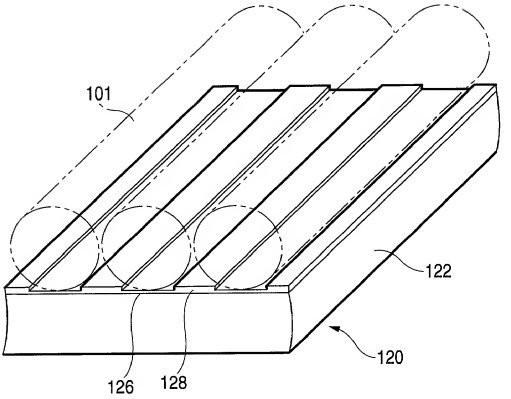

FIG. 5B

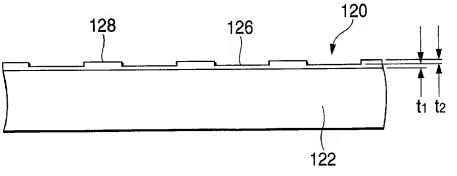

FIG. 6A

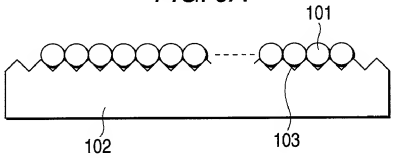

FIG. 6B

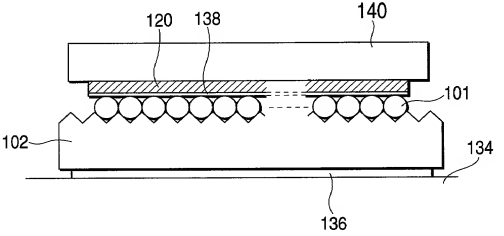

FIG. 6C

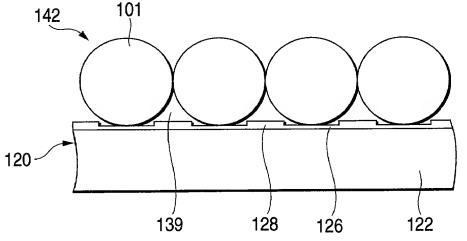

FIG. 7

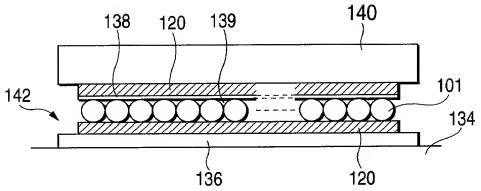
138
120
139
140
142
101
134
136
120

FIG. 8

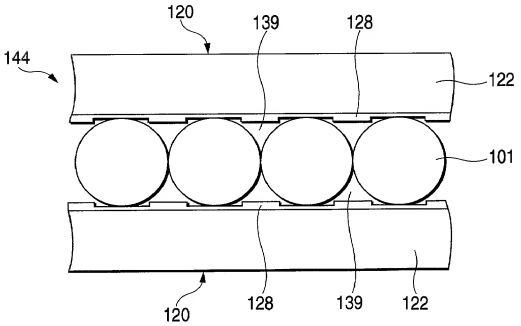
120
139
128
144
122
101
120
128
139
122

FIG. 9

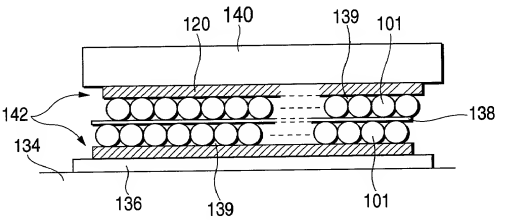
120
140
139
101
142
138
134
136
139
101

FIG. 10

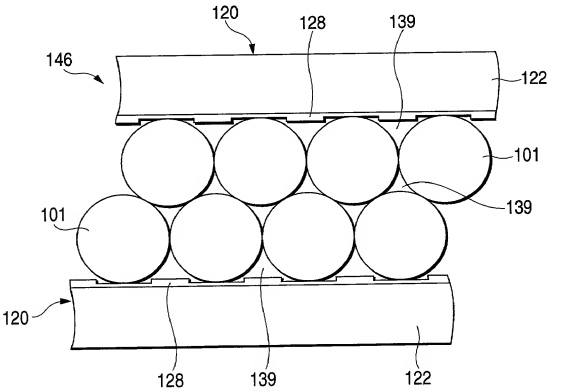
120
128
139
146
122
101
101
139
120
128
139
122

FIG. 11

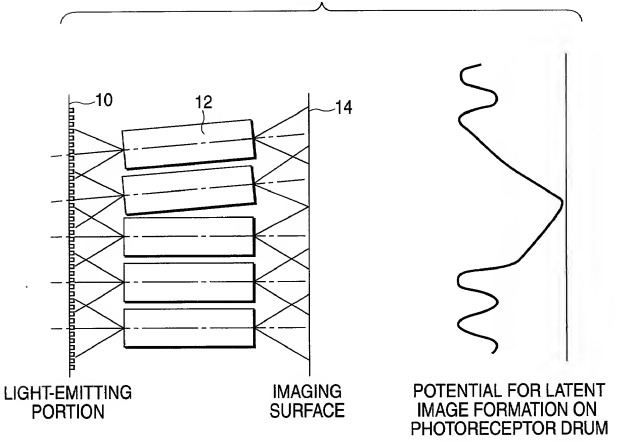

FIG. 12

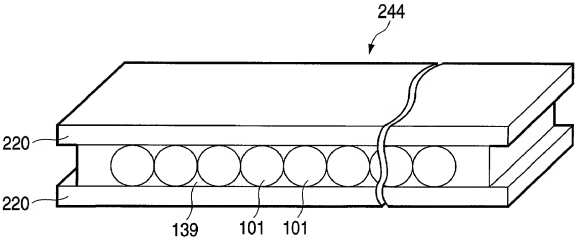
244
220
220
139
101
101

FIG. 13

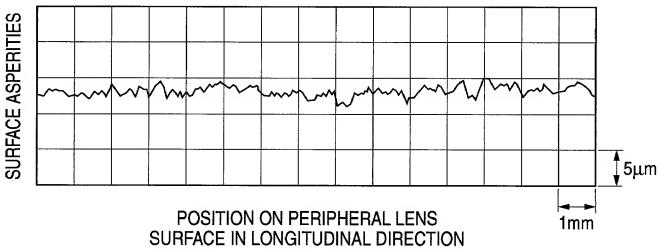
SURFACE ASPERITIES
5μm
1mm
POSITION ON PERIPHERAL LENS
SURFACE IN LONGITUDINAL DIRECTION

FIG. 14

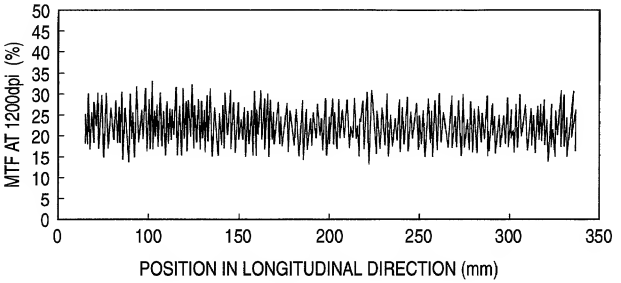
MTF AT 1200dpi (%)
50
45
40
35
30
25
20
15
10
5
0
0
100
150
200
250
300
350
POSITION IN LONGITUDINAL DIRECTION (mm)

FIG. 15

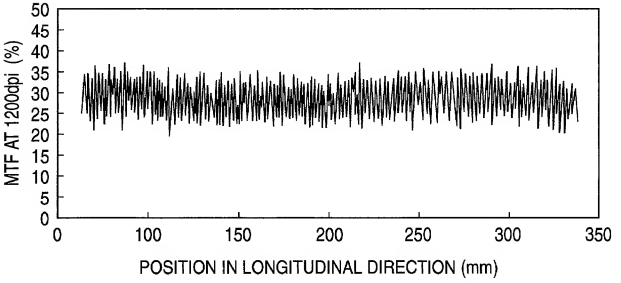
MTF AT 1200dpi (%)
50
45
40
35
30
25
20
15
10
5
0
0
100
150
200
250
300
350
POSITION IN LONGITUDINAL DIRECTION (mm)

FIG. 16

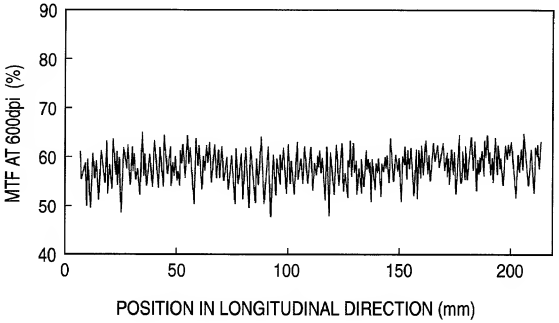
90
80
70
60
50
40
MTF AT 600dpi (%)
0
50
100
150
200
POSITION IN LONGITUDINAL DIRECTION (mm)

FIG. 17

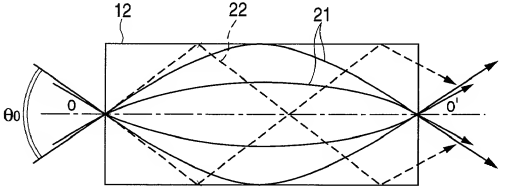
12
22
21
θ0
O
O'

FIG. 18

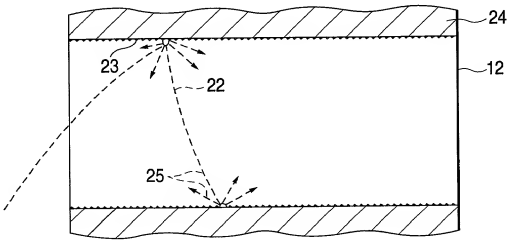
24
23
22
12
25

FIG. 19

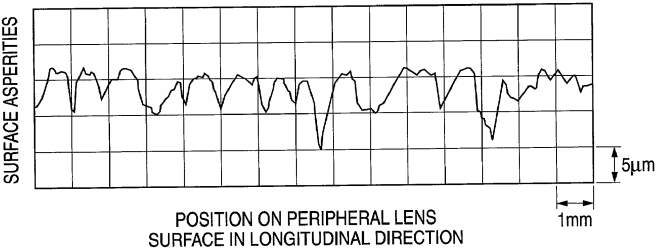
SURFACE ASPERITIES
5μm
1mm
POSITION ON PERIPHERAL LENS
SURFACE IN LONGITUDINAL DIRECTION

FIG. 20

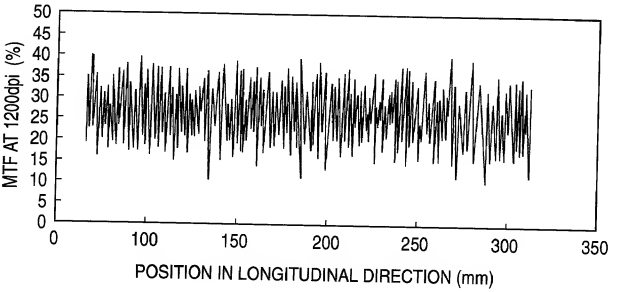
MTF AT 1200dpi (%)
50
45
40
35
30
25
20
15
10
5
0
0
100
150
200
250
300
350
POSITION IN LONGITUDINAL DIRECTION (mm)

FIG. 21

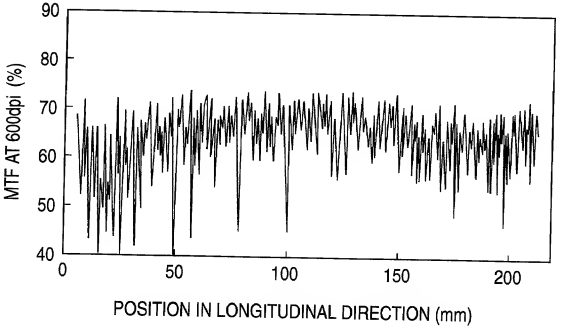
MTF AT 600dpi (%)
90
80
70
60
50
40
0
50
100
150
200
POSITION IN LONGITUDINAL DIRECTION (mm)

FIG. 22

CENTER-LINE-AVERAGE ROUGHNESS (Ra)DEFINED AS:

$$Ra = 1/L \times \int_0^L |f(x)| dx$$

PROVIDED THAT THE CENTER LINE IS TAKEN ON THE X-AXIS AND

DETERMINED FROM $\int_0^L f(x)\, dx = 0$

WHERE f(x) IS THE ROUGHNESS CURVE